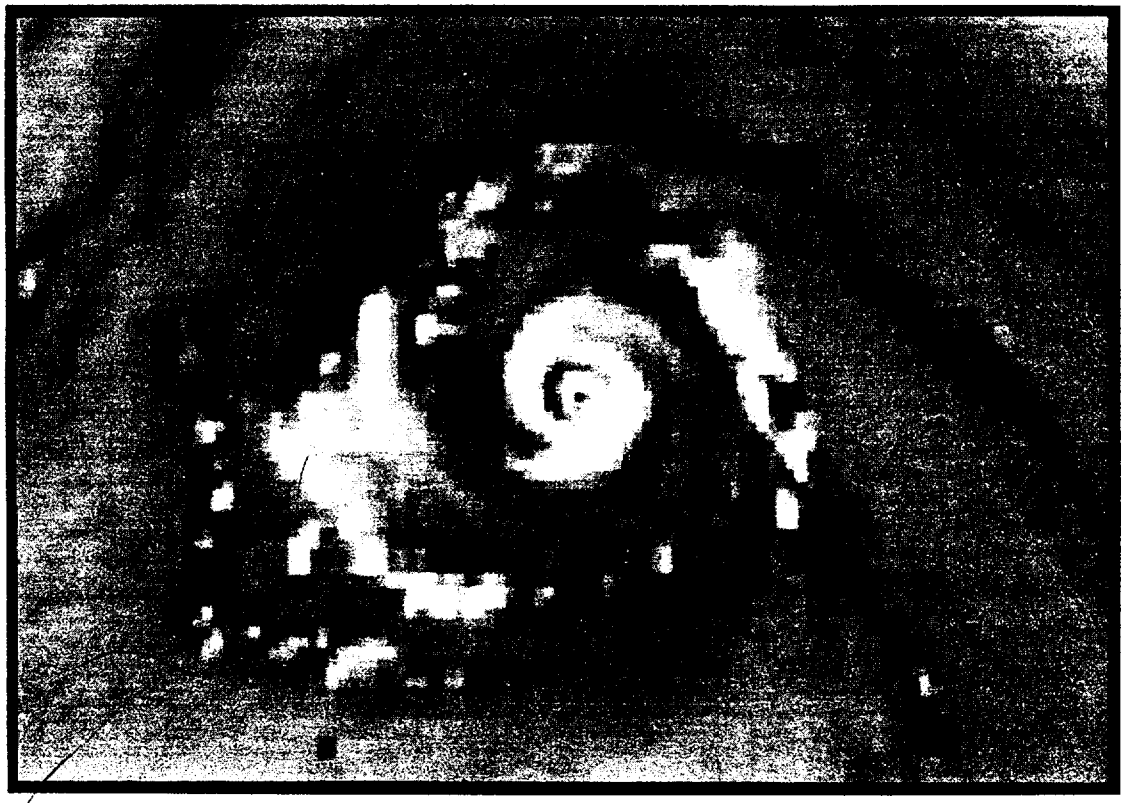
1992
ANNUAL TROPICAL CYCLONE REPORT



JOINT TYPHOON WARNING CENTER
GUAM, MARIANA ISLANDS

FRONT COVER CAPTION: An unusual picture of the concentric eye walls of Super Typhoon Gay (31W) as viewed by the passive microwave imager aboard the Defense Meteorological Satellite Program (DMSP) spacecraft on 191826Z November. The dense cirrus overcast that masks the outer concentric eye wall is transparent in the microwave spectrum, but would be opaque in the visual and infrared. The Meteorological Imagery, Data Display, and Analysis System (MIDDAS) combined the data from three channels (85 GHz horizontally polarized, 85 GHz vertically polarized, and 37 GHz vertically polarized) to make this multispectral image.

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* TRANSFERRED DURING 1992
** ACTIVE DUTY TRAINING

FOREWARD

The Annual Tropical Cyclone Report is prepared by the staff of the Joint Typhoon Warning Center (JTWC), a combined Air Force/Navy organization operating under the command of the Commanding Officer, U.S. Naval Oceanography Command Center/Joint Typhoon Warning Center, Guam. The JTWC was founded 1 May 1959 when the Commander-in-Chief Pacific (USCINCPAC) forces directed that a single tropical cyclone warning center be established for the western North Pacific region. The operations of JTWC are guided by CINCPAC Instruction (CINCPACINST) 3140.1V.

The mission of JTWC is multifaceted and includes:

1. Continuous monitoring of all tropical weather activity in the Northern and Southern Hemispheres, from 180° east longitude westward to the east coast of Africa, and the prompt issuance of appropriate advisories and alerts when tropical cyclone development is anticipated.

2. Issuance of warnings on all significant tropical cyclones in the above area of responsibility.

3. Determination of requirements for tropical cyclone reconnaissance and assignment of appropriate priorities.

4. Post-storm analysis of significant tropical cyclones occurring within the western North Pacific and North Indian Oceans, which includes an in-depth analysis of tropical cyclones of note and all typhoons.

5. Cooperation with the Naval Research Laboratory, Monterey, California on operational evaluation of tropical cyclone models and forecast aids, and the development of new techniques to support operational forecast scenarios.

Changes this year include: 1) wind area radius threshold of 30kt on warnings increased to 35kt ; and, 2) 36-hour forecasts added to western North Pacific and North Indian Ocean tropical cyclone warnings.

Special thanks to: the men and women of the Alternate Joint Typhoon Warning Center for standing in for JTWC which was incapacitated for 11 days after Typhoon Omar's passage; Fleet Numerical Oceanography Center for their unfaltering operational and software support; the Naval Research Laboratory for their dedicated research and forecast improvement initiatives; the Air Force Global Weather Central for continued satellite support and microwave development efforts; the 633d Communications Squadron, Operating Location Charlie and the Operations and Equipment Support departments of the Naval Oceanography Command Center, Guam for their high quality support; all the men and women of the ships and facilities ashore throughout the JTWC AOR, and especially on Guam, who took the observations and communicated them with pride that became the basis for our analyses, forecasts and post analyses; the staff at National Oceanic and Atmospheric Administration (NOAA) National Environmental Satellite, Data, and Information Service (NESDIS) for their tropical cyclone position and intensity support; the personnel of Tropical Cyclone Motion-1992 (TCM-92) for sharing their data and understanding of tropical cyclones; the personnel of the Pacific Fleet Audio-Visual Center, Guam for their assistance in the reproduction of satellite imagery for this report; the Navy Publications and Printing Service Branch Office, Guam; Dr. Bob Abbey and the Office of Naval Research for their support to the University of Guam for the Post-Doctorate Fellow at JTWC; Dr. Mark Lander for his training efforts, suggestions and valuable insights; and AG3 Dave Hazel for his excellent support with the desktop publishing system and graphics.

EXECUTIVE SUMMARY

The Joint Typhoon Warning Center, Guam (JTWC) experienced the busiest year in its 33-year history during 1992, eclipsing the record-setting 1991 year by 250 warnings. In addition to the massive warning workload, the Center also supported several contingencies and scientific field experiments, and endured the assault of five typhoons in less than a 3-month period that included Typhoon Omar which blasted Guam with 105-kt sustained winds and caused $457 million in damages to the island. JTWC warnings were crucial to the safe deployment of ships, aircraft and personnel involved with Operations RESTORE HOPE, FULL ACCOUNTING, and PROVIDE COMFORT. JTWC's participation in such experiments as the TCM-92 (a Naval Postgraduate School/ONR-sponsored mini-field experiment), GTE/PEM-West (a NASA atmospheric chemistry field expedition), and TOGA COARE (an international air-sea interaction field experiment) greatly contributed to the success of each.

In 1992, JTWC issued 1405 warnings, significantly surpassing the 1990 and 1991 records of 1139 and 1155 warnings, respectively. Of the 159 days of the year JTWC was in warning status, 75 of those days had at least two storms, 27 days at least three storms at the same time, and 3 days had four storms occurring simultaneously. JTWC's track forecast performance in 1992 for the western North Pacific was the third best in Center's history, despite the workload. When compared to the climatology-persistence model, CLIPER, JTWC forecasts were 24 percent better across the board, indicating that JTWC forecasts were very good despite a relatively difficult forecast year. In the Southern Hemisphere, forecast errors for the second straight year were below normal, and in the North Indian Ocean the forecast errors were smaller than the long term average for 24 hours, although for 48 and 72 hours they were slightly larger. Intensity forecast errors for western North Pacific tropical cyclones were smaller than average at 24 hours and 48 hours, but showed no improvement over the long term mean at 72 hours.

JTWC and its Air Force satellite reconnaissance component, Det 1, 633d Operations Support Squadron, continued to improve capabilities through the acquisition and exploitation of new technology. The Meteorological Imagery, Data Display, and Analysis System (MIDDAS) gained the capability to process and display all polar orbiting satellite data in addition to geostationary data. The Mission Sensor Tactical Imaging Computer (MISTIC) gained the capability to co-register microwave imager data with conventional infrared data. JTWC was also able to routinely obtain worldwide microwave imager data from FNOC and manipulate it on the MISTIC. And the Naval Research Lab began work on the SPAWRSYSCOM-funded follow-on system to the current Automated Tropical Cyclone Forecast System (ATCF).

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